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AUTHOR McMullen, Barbara E.; Masullo, Miriam J.; Postlethwaite, Bonnie

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ABSTRACT

The mission of Tufts University Academic Technology (AT@Tufts) is to establish a unified technological infrastructure, facilitate appropriate technologies, and provide an atmosphere of support and flexibility for schools, faculty, and students as they incorporate technology into the curriculum for teaching, learning, and research. Tufts University Library Technology Services (ULTS) provides the technological infrastructure, planning and support for library technologies at the University. The Tufts Smart Digital Library is a vehicle for managing knowledge and information in digital format that allows for interactive user interfaces and supports teaching, research, and lifelong learning. A Tufts University Digital Library Task Force was convened to define, analyze and make recommendations on how digital libraries can most effectively and efficiently enhance teaching, learning, research, and administration at Tufts. The Tufts Digital Library Seminar pages have attempted to elicit new thinking and considerations for digital libraries. Those considerations are highlighted in the following sections: Technology Evolution; Community of Users; Enabling Technologies; Architecture and Processes; and Culture Affecting Aspects. (Links to continuation of interactive group discussions follow each section.) The potential opportunities are contrasted with technology misconceptions and potential social risks. Conclusions of the presenters are summarized. (AEF)

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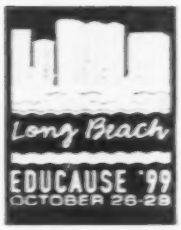

C.J. Keller

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Digital Libraries: Potential and Risks

By Barbara E. McMullen, Tufts University, Miriam J. Masullo, Ph.D., IBM Corporation, and Bonnie Postlethwaite, Tufts University

Presentation scheduled for Track 5, Thursday, October 28, 1999, from 8:15 am - 9:00 am in Rooms D-H of the Hyatt Hotel

http://www.educause.edu/conference/e99/e99_index_main.html

Abstract

It is hoped that, some day, digital technologies will make knowledge and information available, expediently and without barriers through gigabit networks and digital libraries. The technologies and events that combined are called "digital library" are presented. The potential is contrasted with technology misconceptions and potential social risks. Interactive group discussion follows a presentation of the Tufts University Smart Digital Library prototype projects, funding models, development teams, governance issues, roles of School libraries and faculty participation. This paper summarizes the conclusions of the presenters.

Tufts University Academic Technology

The mission of Tufts University Academic Technology **AT@Tufts** is to establish a unified technological infrastructure, facilitate appropriate technologies, and provide an atmosphere of support and flexibility for schools, faculties, and students as they incorporate technology into the curriculum for teaching, learning and research. **AT@Tufts** also advocates for the initiatives of the Tufts Information Technology Council (ITC), the Academic Affairs Subcommittee of the ITC (AAS), and other University technology committees that, in turn, guide the equitable deployment of technologies in support of the academic mission. The mission requires insurance of a technological core and proper level of IT knowledge, expertise, facilities, and support as well as a capacity to accomplish selected initiatives deemed by the academic community as likely to achieve excellence given Tufts' resource constraints. To sustain the mission it is mandatory for **AT@Tufts** to also nurture new and emerging technologies, incubate them, and make them available for experimentation and creative development.

Tufts University Library Technology Services

Tufts University Library Technology Services (ULTS) provides the technological infrastructure, planning and support for library technologies at the University. The department directly supports the library automation system (DRA) and Web-based services for the four autonomous libraries at Tufts. The libraries share the library catalog and as a group license a number of cross-disciplinary databases. The group is key in the examination and implementation of new technologies deemed appropriate for the Tufts libraries. ULTS represents and advocates for the libraries in a variety of information technology

IR020587

committees including the Information Technology Council, the Information Architecture Committee, and the Information Technology Policy Oversight Committee. ULTS reports to the University Provost and works in close collaboration with the University Library Council and AT@Tufts. University Library Technology Services (ULTS)

Tufts University Digital Library Initiative

"The Tufts Smart Digital Library is a vehicle for managing knowledge and information in digital format that allows for interactive user interfaces and supports teaching, research, and lifelong learning." A Tufts University Digital Library Task Force, reporting to the Academic Affairs Subcommittee of the Information Technology Council, will define, analyze and make recommendations on how "digital libraries" can most effectively and efficiently enhance teaching, learning, research and administration at Tufts. The co-chairs of the committee are Barbara McMullen, Director, Academic Technology, and Bonnie Postlethwaite, Director, University Library Technology Services. Each school has been asked to submit names of up to two faculty representatives for this group who will pursue the following:

- Defining what a university-wide digital library will be for Tufts that is responsive to the rapidly evolving technologies and ever changing curricular needs. Such a library should allow for access to the entire digital collection through robust search engines while providing flexibility in front-end design for instructors and librarians.
- Defining how the Tufts digital library will affect culture here and abroad.
- Identifying roles of participants in the digital library.
- Recommending policies relating to content development, ownership, retention, preservation and removal.
- Establishing rules and standards for metadata, copyright management, and access for Tufts and non-Tufts users.
- Recommending the technical infrastructure for the ongoing support of a digital library based on experience with a model which consists of a collaboration of existing digital library projects:

  - **Artifact**

    Artifact, the creation of Dr. Eva Hoffman, Arts, Tufts University, is a digital library of more than 80,000 images used in conjunction with more than three Art History courses at Tufts. Artifact features slides of art from all over the globe, including works from the Islamic, Armenian, and African cultures and provides tools for investigating comparisons between works of art in particular time periods, geographical regions, and cultures.

    Click here for additional information.

  - **Bolles Collection**

    Greg Colati, the Tufts University Archivist, has been digitizing the Bolles Collection, and particularly the maps of London for inclusion in the Tufts digital library. The project is funded by the Berger Foundation.

    Original Berger Foundation grant proposal and **Presentation at DRH conference.**

  - **Health Sciences Database**

    The Health Sciences Database is a digital library of curricular materials used by the Tufts' Medical, Veterinary Medicine, and Dental Schools.

    Click here for additional information.

  - **Perseus**

    Dr. Gregory Crane, Classics, Tufts University, is currently funded by the NSF DLI-2 initiative

to continue the building of The Perseus Project. Perseus is an evolving digital library of resources for the study of the ancient world and beyond. Dr. Crane is the Editor and Chief of the project.

Click here for additional information.

- **Crime and Punishment**

  Crime and Punishment is the creation of Dr. Kent E. Portney, Political Science, Tufts University. Crime and Punishment consists of court room scenerios and images that are stored in a digital library and used for demonstrating the complexities of certain kinds of decision making. It can be used to demonstrate possible biases, to examine patterns, or as a teaching tool. Students can use it to determine what causes judges to rule in the ways they do, or to examine their own prejudices.

  Click here to experience Crime and Punishment.

- Identify a project plan and budgetary requirements for the model for approval by AAS.
- Educating the Tufts community about digital libraries and promoting the benefits of having one.
- Evaluating the model and making recommendations for ongoing governance, funding, scope, organization, and support of a Tufts Digital Library.
- The task force will conduct its work over a 2-year period. The need for oversight for the Tufts Digital Library will be evaluated and recommendations will be made at that time. Membership on this task force includes:
  - Librarians / Archivist as appointed by University Library Council (the Council has representatives from each of the University's libraries)
  - Academic Technology staff as appointed by the Director of Academic Technology
  - Faculty / Researchers from each school (The seven Tufts University Schools are: Arts and Sciences, Fletcher School of Law and Diplomacy, School of Dental Medicine, School of Medicine, Sackler School of Graduate Biomedical Sciences, School of Nutrition Science and Policy, and the School of Veterinary Medicine)
- The task force also relies on the expertise found in the existing ad hoc Digital Library Design Team. The committee taps members of this team, and others, for working groups that address specifics of the digital library design. The team also serves as a resource for feedback and input to the Committee on the many questions that will arise.

A pictorial representation of the Tufts Smart Digital Library that summarizes the scope and intent of the project can be viewed at
The Tufts Smart Digital Library: Concept Chart or **(PDF)**

Digital Library Philosophies

Taking a more cultural, social and philosophical approach to understanding digital libraries may help to yield the future perspective that lies ahead for this technology. With the Tufts Digital Library Seminar pages we have attempted to elicit new thinking and considerations for digital libraries. In the following sections those considerations are highlighted

Technology Evolution

Digital Libraries may be perceived as an evolving technology. It could be that they are much more than that, and in fact part of an evolving knowledge continuum. From the technology perceptive, digital libraries have roots in the *information management* systems of the late 80's and early 90's. Multimedia authoring tools started to become popular in the early 90's as well and eventually merged with database systems and API's to become *data management* systems. But it was not until the Internet became public that *networked-multimedia* and eventually the Web captured the imagination of all with a concept old and novel at the same time: *the digital library*.

Click here for a continuation of this discussion.

Community of Users

Today the concept is evolving, from a large, sometimes thought of as *global library*, *global museum*, *global campus*, etc., anything big, to much more community (of users) oriented environment, even personal in some cases. We now see an emergence of dedicated Web sites that focus on health care, finance, education, and every conceivable bounded domain, as opposed to global libraries. We arrive at these *dedicated library spaces* by means of *portals* and even personalize what we wish to see in them.

Click here for a continuation of this discussion.

Enabling Technologies

Infrastructure is no longer just the Internet backbone. The complexity of the *dedicated infrastructures* rivals content when it comes to adaptability. It is possible to configure everything in the digital library space, from the color of the links, to the alerting sounds, to the organization schemas. Indeed there's no global library; these are personal and always newly made libraries. Components of the infrastructure have to accommodate the access, distribution and media needs of each user.

Click here for a continuation of this discussion.

Architecture and Processes

There's not a single global definition for the term "digital library", and how we define a digital library depends on what it is for a given user at a given time. It's *characteristics* change with use and with time. Users contribute to as well as make use of the digital library. Even a simple search provides clues that help to modify or enhance the digital library space for the next user and *user moment*. In addition, this constant evolution by usage creates a kind of *ecology of information* that further helps to evolve the concept (of a digital library) itself.

Click here for a continuation of this discussion.

Culture Affecting Aspects

Some significant aspects of this phenomenon are taking place with the penetration of *data mining* and *knowledge discovery* technologies. Data mining alters the digital library is ways that are completely unpredictable, by virtue of the discovery process. A data miner does not know what he or she will discover or where the search will go, as it goes beyond extracting information to actually revealing information. In that respect a special *human-information relationship* paradigm emerges. A given person has the potential to alter the digital library in ways that nobody else perhaps can. This has the same social consequences that make us reflect on the issue of equity of access. The more diversely used, the richer it becomes.

Click here for a continuation of this discussion.

More Potential

The opportunities for exploiting new technologies in the university campus continue to increase as national and international focus on these technologies invades more and more the common culture and the media. The Internet and the Web, in particular are already part of our American life-style. Efforts to connect every school and classroom in America must be coupled with an infrastructure at the university level that is prepared to receive Web-ready students. That infrastructure is today the campus digital library.

Many universities, like Tufts, have strategies and committees in place to support the digital library as efficiently and carefully as the traditional library is maintained. Surprisingly, this has caused many

campus (physical) library structures and facilities to undergo renovations and enhancements to augment and modernize for accommodating the new technologies. In short, there has been a marrying of library cultures (physical and digital) to provide the best functionality and quality of services for the students. Indeed what was expected to be an "atoms to bits" future, is increasingly becoming an "atoms and bits" reality.

At Marist College, collaboration with the FDR Library is producing results that contribute to the preservation of the physical media and much increased access to the intellectual media, as expected. Similar results are expected are Tufts with *Perseus* and *Artifacts*, for example. In that respect, digital library technologies promise much potential cultural (preservation) and educational (access) gains.

Less Risks

It should not be forgotten for one moment that equity of access has not to this day been achieved, and in 1998, we still had only 39% of poor classrooms online. But even in this climate of much concern (haves and have-nots), need for legislation (E-rate), and even panic (Digital Divide Report), at least at the academic level a course has been charted where the digital library complements, and is a part of the traditional library, academic computing and, even curriculum. The digital library could play many more roles in the campus environment of the future. The impact of this *technology diversification* is yet to be assessed.

The Road Ahead is only a Few Steps to the Laptop

E-commerce and click-trade have not been factored into the campus equation. *Distance Learning* is today evolving into *Close-by and Personal Learning*. Students will be able to find courses in an *open global campus* space to match their interests and academic potential, and they can find these resources in their own laptop, wherever they happen to be. *Inter-campus digital libraries* will offer the best educational fit for students in any campus, and the global campus will become part of a *global academic spectrum* available to all of academia.

Information, media, perhaps knowledge, are all in the digital library. We once sought to put as much of it as possible in books, we then tried to make some of it come into our living rooms through a cable-box, and we now bring it all everywhere and anyhow in a web. As we continue to evolve, culturally, socially and politically, this globally shared digital library that once was called "television" and today is called "the Web", is becoming just simply a "community of media" that is shared in ever more effective and meaningful ways. Let's hope that this new dimension that's as close as the span of a hand will be open space and as equally shared by all as it is built by all.

References

Pictorial representation of the Tufts Smart Digital Library at
The Tufts Smart Digital Library: Concept Chart or **(PDF)**

Annotated links at
http://www.tufts.edu/tccs/at/digital-library/other.shtml

Tufts University Academic Technology at
http://www.tufts.edu/tccs/at/

Primary resources for the presentation are available at
http://www.tufts.edu/tccs/at/austin-lecture/archives/Miriam/dllec.htm

Crime and Punishment is located at
http://www.tufts.edu/tccs/services/css/crimeandpunishment.html

The Perseus Project is located at

http://www.perseus.tufts.edu

The Health Sciences Database is located at
http://hsdb.hsl.tufts.edu

These resources are continually updated on the Tufts Academic Technology Web pages.

Contact Us!

Barbara E. McMullen Director of Academic Technology
Tufts University
Arena Computer Annex
Medford, MA 02155
Voice: 617-627-3801
Fax: 617-627-3667
barbara.mcmullen@tufts.edu
http://www.tufts.edu/~bmcmul01

Miriam J. Masullo, Ph.D
Research Staff Member
Thomas J. Watson Research Center
IBM Research
30 Saw Mill River Road
Hawthorne, NY 10532
Voice: 914-784-7592
Fax:914-784-7455
masullo@us.ibm.com

Also:
Miriam J. Masullo, Ph.D.
Director, Educational Technologies
National Action Council for Minorities in Engineering -NACME
The Empire State Building
350 Fifth Avenue, Suite 2212
New York City, NY 10118-2299
Voice: 212-279-2626
Fax: 212-629-5178
mmasullo@nacme.org

Bonnie Postlethwaite
Director
University Library Technology Services
Tufts University
Tisch Library
Medford, MA
Voice:617-627-3909
Fax:617-627-3002
bpostlet@tufts.edu

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Transforming Education Through Information Technologies

Abstract

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